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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,478	03/26/2004	Kazuya Imafuku	00862.023517	8334

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NEW YORK, NY 10112

EXAMINER

REDDING, THOMAS M

ART UNIT	PAPER NUMBER
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2609

MAIL DATE	DELIVERY MODE
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05/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/809,478

Applicant(s)

IMAFUKU ET AL.

Examiner

Thomas M. Redding

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/7/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because it refers to details in figure 9 (e.g. reference number S9001, S9004, etc...). The abstract should be able to stand alone without reference to the rest of the disclosure. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and

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Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claim 11 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 11 defines a computer program embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium"

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which are deemed non-statutory (refer to “note” below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A “signal” (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible “thing”) and therefore does not fall within one of the four statutory classes of § 101. Rather, “signal” is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a “signal”, the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a “signal”, “carrier wave”, or “transmission medium”, the examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 6, 11 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Luo (US 2003/0161547 A1) and Castleman (Prentice Hall, 1996, cited to further describe an inherency in the Lloyd-Max algorithm suggested by Luo).

5. Regarding claims 1, 6, 11 and 12, Luo discloses a system and method for [a]n image processing apparatus for executing a smoothing process of image data, comprising: extraction means for extracting a pixel of interest and surrounding pixels thereof from input image data ("If input image 101 is a chromatic image, input image 101 is separated into grayscale component 102 and chromatic component 103", Luo, paragraph [0012], line 1, Luo extracts pixels of the whole image); first average value calculation means for calculating an average value of the pixels extracted by said extraction means ("In step 202, quantization of grayscale component 102 may occur.

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Quantization advantageously reduces the number of gray levels of the original image to 'n-levels.'", Luo, paragraph [0016], line 4. Note: Luo mentions using the Lloyd-Max algorithm which does converge on an average for each region, see Castleman); separation means for separating the pixels extracted by said extraction means into two categories using the average value calculated by said first average value calculation means ("In step 203, the quantized grayscale component is decomposed into binary images. A binary image may created on the basis of points in the quantized gray scale image that are greater than a grayscale threshold", Luo, paragraph [0017], line 1); second average value calculation means for calculating average pixel values of the two categories (the Lloyd-Max algorithm described above) and output means for outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated by said second average value calculation means ("In step 205, the filtered binary images $B'.sub.i(x,y)$ are recombined to produce segmentation result $(R(x,y))$.", Luo, paragraph[0022], line 1). Claim 1 invokes 35 USC § 112 6th paragraph "means or step plus function" limitations (MPEP 2181) for several described elements (e.g. "extraction means", "calculation means", and so forth).

However the applicant also discloses that the invention may be implemented by software code on a computer (page 31, paragraphs 3-5). Luo similarly discloses the use of a computer (Luo, figure 4, and paragraphs 36 – 40). Thus the means described by the applicant in the claims are equivalent to the means disclosed by Luo.

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Regarding claims 11 and 12, Luo teaches all of the method that is in common with claim 1. Luo further discloses both computer executable program code (Luo, Figure 4 and paragraph 37) and computer readable media having computer executable code (Luo, Figure 4, and paragraphs 37-39).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo (US 2003/0161547 A1) in combination with Sasaki (US 2001/0048771 A1).

Regarding claims 2 and 7, Luo teaches [a]n image processing apparatus for executing a smoothing process of image data, comprising: extraction means for extracting a pixel of interest and surrounding pixels thereof from input image data ("If input image 101 is a chromatic image, input image 101 is separated into grayscale component 102 and chromatic component 103", Luo, paragraph [0012], line 1, Luo extracts pixels of the whole image); first average value calculation means for calculating an average value of the pixels extracted by said extraction means("In step 202, quantization of grayscale component 102 may occur. Quantization advantageously reduces the number of gray levels of the original image to 'n-levels.'", Luo, paragraph

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[0016], line 4. Note: Luo mentions using the Lloyd-Max algorithm which does converge on an average for each region, see Castleman); separation means for separating the pixels extracted by said extraction means into two categories using the average value calculated by said first average value calculation means ("In step 203, the quantized grayscale component is decomposed into binary images. A binary image may be created on the basis of points in the quantized gray scale image that are greater than a grayscale threshold", Luo, paragraph [0017], line 1); second average value calculation means for calculating average pixel values of the two categories (the Lloyd-Max algorithm described above); Additionally Luo teaches outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated in the step (d) ("In step 205, the filtered binary images $B'_{sub.i}(x,y)$ are recombined to produce segmentation result $(R(x,y))$.", Luo, paragraph [0022], line 1). Claim 2 invokes 35 USC § 112 6th paragraph "means or step plus function" limitations (MPEP 2181) for several described elements (e.g. "extraction means", "calculation means", and so forth). However the applicant also discloses that the invention may be implemented by software code on a computer (page 31, paragraphs 3-5). Luo similarly discloses the use of a computer (Luo, figure 4, and paragraphs 36 – 40). Thus the means described by the applicant in the claims are equivalent to the means disclosed by Luo.

Luo does not teach [a] determination means for determining whether or not the pixel of interest belongs to a flat region; and output means for, when said determination means determines that the pixel of interest does not belong to a flat region, outputting a

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value, which is approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated by said second average value calculation means.

Sasaki, working in a similar problem solving area of interpolation of resolution, does teach teach [a] determination means for determining whether or not the pixel of interest belongs to a flat region; and output means for, when said determination means determines that the pixel of interest does not belong to a flat region, outputting a value, which is approximate to a pixel value of the pixel of interest, of the average pixel values of the two categories calculated by said second average value calculation means ("The average value calculator 103 calculates an average value of the two intermediate values sent from the intermediate value detector 102 and then, it outputs the average value thus calculated to the output memory 104.", Sasaki, paragraph 16 , line 1).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add to the system of Luo, the edge interpolation means and method of Sasaki in order "to suppress or eliminate jaggies at the contours in the image", Sasaki, paragraph 27, line 4.

8. Claims 3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Luo (US 2003/0161547 A1) and Katayama (US 6,404,936 B1).

Regarding claims 3 and 8, Luo teaches all the elements that are common with claims 1 and 6 (reference the rejection of claim 1 and 6 above).

Luo does not disclose an image reduction means for reducing an input image.

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Katayama, working in a related problem solving area of image segmentation, does teach an image reduction means for reducing an input image ("In step S2, each image data is decimated at a proper reduction ratio", Katayama, column 5, line 49)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add to the system of Luo, the image reduction means and method of Katayama in order "to increase the processing speed of the subsequent steps", Katayama, Column 5, line 50.

9. Claims 4, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Luo (US 2003/0161547 A1), Sasaki (US 2001/0048771 A1) and Katayama et al. (US 6,404,936 B1).

Regarding claims 4 and 9, the combination of Luo and Saskia teaches all the elements that are common with claims 2 and 7 (reference the rejection of claim 2 and 7 above).

The Luo and Saskia combination does not disclose an image reduction means for reducing an input image.

Katayama, working in a related problem solving area of image segmentation, does teach an image reduction means for reducing an input image ("In step S2, each image data is decimated at a proper reduction ratio", Katayama, column 5, line 49)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add to the combination of Luo and Saskia, the image reduction means

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and method of Katayama in order "to increase the processing speed of the subsequent steps", Katayama, Column 5, line 50.

10. Claims 5, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Luo (US 2003/0161547 A1) and Avinash (US 2003/0095715 A1).

Regarding claims 5 and 10, Luo teaches all the elements that are common with claims 1 and 6 (reference the rejection of claim 1 and 6 above).

Luo does not teach a selection means for selecting one of the value output by said output means and the pixel value of the pixel of interest in accordance with a difference value between the value output by said output means and the pixel value of the pixel of interest.

Avinash, working in the field of endeavor of segmentation based image noise reduction, does disclose selection means for selecting one of the value output by said output means and the pixel value of the pixel of interest in accordance with a difference value between the value output by said output means and the pixel value of the pixel of interest ("each pixel, after multiplication, is compared to both a minimum and a maximum threshold value. Pixels which exceed the maximum threshold value are set equal to the maximum threshold value. Likewise, pixels which are less than the minimum threshold value are set equal to the minimum threshold value." Avinash, paragraph 85, line 1).

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It would have been obvious at the time the invention was made to one of ordinary skill in the art to add to the system of Luo the thresholding method of Avinash in order to more strongly enhance weaker edges while providing a more limited enhancement to edges which are already strong (Avinash, paragraph 85, line 14).

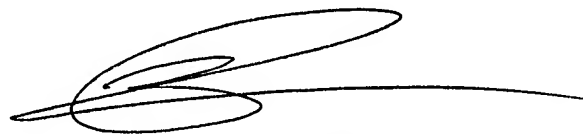
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TMR



BRIAN WERNER
SUPERVISORY PATENT EXAMINER